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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER	
LEWIS, DAVID LEE	
ART UNIT	**PAPER NUMBER**
2673	

DATE MAILED: 02/23/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/025,175	ALBECK ET AL.	
	Examiner	Art Unit	
	David L Lewis	2673	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *17 September 2004*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-49* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-49* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

1. **Claims 1-49 are rejected under 35 U.S.C. 102(e) as being anticipated by Mack et al. (6125197).**

2. **As in claims 1 and 25, Mack et al. teaches of** a digital imaging system, **figures 1 and 4**, comprising: an image recording device configured to record at least one image of a scene, the scene comprising at least one object and at least one target, **figure 1 item 12 and 13, figure 4 item 42 or 44 (column 3 lines 50-60)**; a scene illumination arrangement configured to illuminate the scene, the scene illumination arrangement being configured to illuminate the scene to facilitate disambiguation between the at least one object and the at least one target, **figure 1 item 16, figure 4 item 41 (column 4 lines 20-25 and 60-65)**; an image processing subsystem configured to process the at least one image to identify a location of the image of the at least one target in the at least one image, **figure 11 items 110-134, (figure 1 item 19, flow chart controlled by the computing**

device), column 3 lines 55-60, thereby to facilitate relating a local coordinate system associated with the location from which the image recording device recorded the at least one image of the scene to a global coordinate system, **figure 1 item 19, column 3 lines 43-67, column 4 lines 30-45**. Wherein Mack et al. teaches of a system for capturing both textual and structural light from a real object, said textual and structural light having distinct wavelengths, said captured information being used to re-construct 3D models by the intersection of the extrapolated information of said textual and structural light, as found in claims 1 and 25. The reason for the structured light is to provide a structure to the target object that is easily recognizable by a computing device.

3. **As in claims 2 and 26, Mack et al. teaches of** in which the at least one target has a surface configured to reflect light of a selected wavelength, **column 5 lines 58-67**; the scene illumination arrangement is configured to illuminate the scene with illumination of the selected wavelength, **column 5 lines 25-35**; and the image processing subsystem is configured to identify the location of the image of the at least one target as the location in the at least one image of a region representing the image of light of the wavelength reflected by the surface of the at least one target, **column 4 lines 27-45, column 5 lines 24-35, figure 4 and 11**. **As in claim 3 and 27, Mack et al. teaches of** in which the scene illumination arrangement is configured to illuminate the scene with uniform light of the selected wavelength, column 5 lines 25-35. **As in claim 4 and 28, Mack et**

al. teaches of in which the selected wavelength comprises a band of wavelengths, column 5 lines 25-57. **As in claim 5 and 29, Mack et al. teaches of** in which the scene illumination arrangement is further configured to illuminate the scene with structured illumination at a further wavelength that is not reflected by the at least one target, column 5 lines 25-57, non-visible structured light. **As in claim 6 and 30, Mack et al. teaches of** in which the further wavelength comprises a band of wavelengths, the band of wavelengths and the selected wavelength being disjoint, column 5 lines 25-57, wherein composite filters are used. **As in claim 7 and 32, Mack et al. teaches of** in which the at least one target has a surface configured to reflect light of a selected wavelength, **column 3 lines 50-60, column 5 lines 25-35**; the scene illumination arrangement is configured to illuminate the scene with uniform illumination of the selected wavelength, and structured illumination of at least one other wavelength, column 5 lines 1-20; and the image recording device is configured to record two images, one of said images comprising an image recorded while the scene illumination arrangement illuminates the scene with light of the selected wavelength, column 5 lines 1-20; and the other of said images comprising an image recorded while the scene illumination arrangement illuminates the scene with light of the at least one other wavelength, column 5 lines 1-20.

4. **As in claim 8 and 33, Mack et al. teaches of** in which the image recording device includes a beam splitter arrangement configured to divide light reflected

thereto from the scene into two portions, figure 1 item 17, and two filters, each to allow light of one of the respective wavelengths to pass to an image recording medium, column 4 lines 20-30, column 6 lines 23-28. **As in claim 9 and 34, Mack et al. teaches of** in which the scene illumination arrangement is configured to illuminate the scene with illumination of having respective selected polarization directions, illumination of one polarization direction being uniform illumination and illumination of the other polarization direction being structured illumination, column 6 lines 1-10; the at least one target having a surface configured to reflect illumination incident thereon in a manner to preserve the polarizatiion direction and the at least one object having a surface configured to reflect illumination incident thereon in a manner to not preserve the polarization direction, column 5 lines 62-67, column 6 lines 19-33; the image recording device is configured to record an image of the scene such that the image of the at least one target reflects uniform illumination incident on the surface thereof, column 6 lines 1-15; and the image processing subsystem is configured to identify the location of the image of the at least one target in relation to the uniformity of the image thereof as recorded by the image recording device, column 6 lines 15-45. **As in claim 10 and 35, Mack et al. teaches of** in which the scene illumination arrangement is configured to illuminate the scene such that the uniform illumination is in a first selected direction and the structured illumination is in a second selected direction perpendicular to the first selected direction, column 4 lines 20-60, column 6 lines 20-35; and the image recording device is provided with a polarization

arrangement configured to pass illumination in the first selected direction to an image recording medium, thereby ensuring that structured illumination reflected from the surface of the at least one target is not depicted in the image recorded by the image recording medium, column 6 lines 15-45. **As in claim 11 and 36, Mack et al. teaches of** in which the at least one target is located in a position in the scene displaced from the position of the at least one object, column 5 lines 62-67, column 6 lines 19-33; the scene illumination arrangement is configured to provide uniform illumination in at least one region of the scene in which the at least one target is located, and structured illumination in at least one portion of the scene in which the at least one object is located, column 6 lines 1-10; and the image processing subsystem is configured to identify the location of the image of the at least one target in relation to the uniformity of the image thereof as recorded by the image recording device, column 6 lines 15-45. **As in claim 12 and 37, Mack et al. teaches of** in which the scene illumination arrangement is configured to provide uniform illumination and structured illumination, column 6 lines 15-35; and the image processing subsystem is configured to enable the scene illumination arrangement to illuminate the scene by uniform illumination, and enable the image recording device to record a first image of the scene, and use the first image to determine the location of the at least one target in the scene, column 5 lines 57-67, figure 4; and thereafter enable the scene illumination arrangement to illuminate the portion of the scene at which the at least one target is located by uniform illumination and at least one other portion

of the scene with structured illumination, column 6 lines 15-35, figure 4, and enable the image recording device to record a second image of the scene, and use the second image to determine the location of the at least one target in the scene, thereby to facilitate relating the local coordinate system associated with the location from which the image recording device recorded the second image of the scene to the global coordinate system, column 16 lines 5-45, figure 11.

5. **As in claim 13 and 38, Mack et al. teaches of** in which the scene illumination arrangement includes a pattern generator configured to selectively generate uniform illumination for at least one portion of the scene and structured illumination for at least a second portion of the scene, column 4 lines 20-44. **As in claim 14 and 39, Mack et al. teaches of** in which the image recording device is configured to record successive images of the scene at points in time separated by a relatively short time interval, column 5 lines 1-18, and the scene illumination arrangement is configured to illuminate at least the at least one target with uniform illumination when the image recording device records one of said successive images, column 5 lines 1-18, and the at least one object with structured illumination when the image recording device records the other of said successive images, column 5 lines 1-18.

6. **As in claim 15 and 40, Mack et al. teaches of** in which the scene illumination arrangement is configured to provide uniform illumination and structured

illumination, **figure 1, 2, 4, and 12**; and the image processing subsystem is configured to enable the scene illumination arrangement to illuminate the scene by uniform illumination, **figure 4 item 43**, and enable the image recording device to record a baseline image of the scene, **figure 4 item 44,** and determine the location of the at least one target in the baseline image, **column 16 lines 5-25, column 22 lines 1-5**; enable the scene illumination arrangement to illuminate the scene by structured illumination, **figure 4 item 41**, and enable the image recording device to record a working image of the scene**, figure 4 item 42**, and using the location of the at least one target in the baseline image, determine the location of the at least one target in the working image, **column 3 lines 30-65, column 16 lines 5-45**.

7. **As in claim 16 and 41, Mack et al. teaches of** in which the image processing subsystem makes use of a selected search methodology, in which the image processing subsystem searches at least a region of the working image proximate the location of the at least one target in the baseline image, in determining the location of the at least one target in the working image, figure 11 items 112 and 114. **As in claim 17 and 42, Mack et al. teaches of**, in the selected search methodology, the image processing subsystem searches at least one region of the working image proximate the location of an edge of the at least one target in the baseline image, in determining the location of the at least one target in the working image, figure 11 items 112 and 114. **As in claim 18 and 43, Mack et al.**

teaches of in which the at least one target has a selected shape, the search methodology reflecting the selected shape, figure 3c,d. **As in claim 19 and 44, Mack et al. teaches of** in which, in the selected search methodology, the image processing subsystem detects at least one edge of the at least one target in the baseline image and in the working image and performs a distance transform operation between them in order to determine the location of at least one target in the working image, column 4 lines 30-60, figure 11. **As in claim 20 and 45, Mack et al. teaches of** in which, in the selected search methodology, the image processing subsystem detects edges of the at least one target in the baseline and in the working image sets, column 4 lines 30-60, figure 11, determines a shape of a contour of the target image in the baseline image set and best fits the shape of the contour with the edge of the target image in the working image set in order to determine the location of at least one target in the working image, column 4 lines 30-60, figure 11. **As in claim 21 and 46, Mack et al. teaches of** in which the selected search methodology is a least squares fit methodology, column 3 lines 61-67, column 4 lines 1-8. **As in claim 22 and 47, Mack et al. teaches of** in which the image processing subsystem is further configured to generate a mask representing the image of the target in the baseline image, figure 3a-d, column 4 lines 35-60, column 15 lines 49-67, the image processing subsystem being further configured to use the mask to define the region in the working image in which it performs the selected search methodology, figure 3a-d, column 4 lines 35-60, column 15 lines 49-67. **As in claim 23 and 48, Mack et**

al. teaches of in which the mask includes a mask element that is a selected percentage of the size of the target in the baseline image, figure 3a-d, column 4 lines 35-60, column 15 lines 49-67, the mask element defining the region in the working image in which the image processing subsystem performs the selected search methodology, figure 11. **As in claim 24 and 49, Mack et al. teaches of** in which the image processing subsystem is further configured to determine a transformation between the baseline image and the working image, thereby to facilitate relating the local coordinate system associated with the location from which the image recording device recorded the working image of the scene to the global coordinate system, figure 11. **As in claim 31, Mack et al. teaches of** in which each of the at least one object and at least one target has a surface configured to reflect light of respective selected wavelengths, figure 4, column 5 lines 57-67, the scene illumination step including the step of illuminating the scene with illumination of the respective selected wavelengths, figure 4 item 41; and the image processing step includes the step of identifying the location of the image of the at least one target as the location in the at least one image of a region representing the image of light of the wavelength reflected by the surface of the at least one target, figure 4 item 42.

Response to Arguments

8. Applicant's arguments filed 9/17/2004 have been fully considered but they are not persuasive. Applicant argues the object and target are separate, and the prior art of record fails to relate the 3D coordinates of the "target object" to a global system. Mack et al. specifically teaches of a "target object", column 4 lines 29-33, wherein structured light is to provide a structure to the target object that is easily recognizable by a computing device. The 3D data triangulation performed by the microprossesor controlled computing device relates the 3D coordinates of the target object to a global three dimensional coordinate system, column 3 lines 5-67, column 4 lines 1-45. The structured light further allows for detection of a disambiguous object. Rejection maintained.

Conclusion

9. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a). A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the

advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to David L Lewis whose telephone number is 703 306-3026. The examiner can normally be reached on M, T, TH, F. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Bipin Shalwala can be reached on 703 305-4938. Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703 305-4700.

Any response to this action should be mailed to:
Commissioner of Patents and Trademarks
Washington, D.C. 20231
or faxed to:
(703) 872-9314 (for Technology Center 2600 only)
Hand-delivered responses should be brought to Crystal Park II, 2121 Crystal Drive, Arlington, VA, Sixth Floor (Receptionist).
Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Technology Center 2600 Customer Service Office whose telephone number is (703) 306-0377.

February 21, 2005

BIPIN SHALWALA
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2600